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I, JANENE PEISKER, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2004901915 for a patent by E BALL GAMES PTY. LIMITED as filed on 08 April 2004.


WITNESS my hand this
Eleventh day of May 2005

JANENE PEISKER
TEAM LEADER EXAMINATION
SUPPORT AND SALES

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# PROVISIONAL SPECIFICATION

APPLICANT: E Ball Games Pty. Limited
NUMBER:
FILING DATE:

Invention Title: ELECTRONIC BALL GAME

The invention is described in the following statement:-

# ELECTRONIC BALL GAME

## Area of the Invention

This invention relates to the area of electronic games and in particular to an electronic ball game which is provided with means to detect the motion of a ball and determine its trajectory as an input to the game.

## Background to the Invention

There are many electronically based games on the market which are operated by the use of a joy stick or the like. These however do not provide any real interaction between a player and the game in that they do not test a player's playing prowess but rather their reaction speed to game prompts.

The system of the invention will be described specifically in relation to a golf game but it is to be understood that it has applications in relation to other games such as simulated tennis, cricket, baseball, soccer, basketball, netball, rugby or Australian Rules football or any other ball game.

## Outline of the Invention

It is an object of the invention to provide a truly interactive ball game whereby a player kicks, throws or otherwise projects a ball towards its desired destination and actual involvement in the game is simulated.

The invention is an interactive ball game which includes a screen or upon which the game is displayed and which acts as a target, and a ball sensing apparatus which detects the motion of a ball as it passes through it, said sensing apparatus having associated software which determines the

trajectory of the ball and its level of success in the game with respect to the target, and means for preventing a ball from hitting the screen.

It is preferred that the means for preventing the ball hitting the screen is a net in front of the screen through which the screen is visible.

It is further preferred that the game be enclosed in a housing, again preferably of some see through mesh material.

It is preferred that the sensors used in the ball sensing apparatus be infra-red transmitters and receivers although any appropriate sensors can be used. It is further preferred that the sensing apparatus consist of two rectangular grids of such sensors separated by a pre-determined distance.

It is also preferred that the ball may be sensed in more than one plane and while two is the number described here it is envisaged that three could be used.

In order that the invention may be more readily understood I shall describe by way of non limiting example a specific embodiment of the invention.

**Description of an Embodiment of the Invention**

In one embodiment of the invention the ball sensing apparatus consists of two parallel rectangular members which comprise part of a housing around the game and are spaced some distance away from a display screen or target.

The interior face of each rectangular member is provided on all sides with an array of infra red light transmitters and receivers.

In this embodiment of the invention, the infra red light sources are driven in synchronisation and when the ball passes between the beam and the sensor,

the signal to the sensor is eliminated so from each beam there is an indication of the position of the ball at the time of the breaking of the beam.

If there are two such beams, then the position of the ball will be at the intersection of the beams at the time and this can be calculated by a computer device which is programmed to know where the beams are at any time and the two signals can be integrated to provide a position signal for the ball. If the starting point of the ball is known, then a trajectory can be calculated.

Alternatively, and preferably there may be tracking of the balls movement at a number of positions and this can be achieved either by having the sensor array so that there will be a number of breaking of the light beams over a short period or alternatively more than two light sources and associated sensors can be located at positions so that the position of the ball at at least two time intervals is calculated. The trajectory between the various positions can be calculated and the subsequent trajectory can be estimated.

From these calculations software can provide information about characteristics of the movement of the ball and this can be displayed on a monitor for examination by the user in an interactive game or in an interactive competition.

As well as, or as an alternative to these possible methods of display, the information may be held in the memory of the computer for later recovery and use. For example statistical means may be used to provide information about a large number of similar events, details of best and worst 'scores', the trajectory and speed, can be held in the memory.

This information can be used to establish changes over time in the players results and can also be used for competition input.

The system of the invention can provide a rebound net behind the measuring position so that the ball can be returned to the player for restriking so that a continuous game involving multiple shots can be simulated by the system.

In a simple form of the invention, I provide a net or continuous target at which a game ball may be directed, and, as indicated earlier for ease of description, I shall describe the use of a golf ball with the device.

The target, which could be a physical target or could, say, be a scene of a golf hole printed on the material of the target so that the person playing with the device can deliberately aim the ball at a particular position on the course.

Associated with, and preferably just in front of the net, I provide an interlinking mesh of infra red beams which can consist of two groups of beams at right angles to each other, the arrangement being such that distortion of two beams will indicate the position at which the ball strikes the net.

If required, I could provide an indicator which, immediately after the ball strikes the net, provides an indication at the position at which the strike was made and I can also provide recording means whereby the position at which a number of strokes meet the net can be recorded and used by the player or a coach to examine the consistency and statistical variation from the required target in a number of strokes.

In order to use this device the player simply locates his/her ball and, with the required club, aims at the background to the position at which he/she requires the ball to pass and hits the ball.

When the ball is struck, shortly before it hits the net, it passes through the infra red beam array and the position is recorded on the two beams at right angles through which the ball passes.

The actual mode of detection of the ball may vary but, in one particular form, if the beam normally passes to a receiver then the intensity at the receiver will

reduce when the ball is passing through the beam, as the beam is somewhat distorted and, from this, an indication of the position is obtained.

It may well be that, if the player is a good player, he/she may be deliberately intend a ball to deviate from the initial target position because of an imposed fade or draw and it may thus be that the important aspect to the player is not so much where the ball causes actuation of the infra red sensors but rather the consistency of this position when a number of shots of a similar type are made.

In order to provide further information, I can provide a number of spaced arrays and means to receive and correlate the position as it passes through each array and, from this, can obtain an indication of the path of the ball through the arrays.

It will be appreciated that the ball sensing apparatus of the invention can also give an indication of where the net is struck by any type of ball whether a soccer ball or a tennis ball or a thrown ball such as a cricket ball or a baseball.

There is, again a target which has a painted or printed background, and a net or screen in front of it which is used to absorb the kinetic energy of the ball as it reaches this.

The target may be either a physical target or more preferably may be a scene appropriate to the sporting game being played. As an illustration the player could participate in a simulated environment like a famous shot from a golfing tournament, like Greg Norman shot at the 1996 US Open so that they feel as though they were playing that shot.

If required a rear projection screen may be provided on which different targets may be readily located.

The sensors are located in front of the target directed towards the path of the ball and may be in a protective housing or behind the net or screen for protection purposes.

Each of the sensors are connected to a control box which has software which enables the signals from the various sensors to be integrated and to provide a path of the ball as it moves towards the net.

It is preferred that the signals operate in synchronisation and this can also be controlled by the computer program.

For each signal of the sensors, using two planes, a position is provided in two dimensions of the ball and, over the flight of the ball, the various positions can be shown as a ball path.

If it is of value to obtain a three dimensional path, then at least a third plane is required and this will enable the path to be tracked in three dimensions. In this case the points at each exposure can be stored as a table and can be presented to a viewer either in this form of a fixed image or in the form of where the image is plotted.

The actual variations can enable a software program which located in the control box to get an indication of the actual movement of the ball and from this determine the path of the ball.

The control box can, within milliseconds of the ball passing through the sensors, calculate the speed and path of the ball and transfer the details to the game as a result of this shot.

The output of the game can be fed directly to an Internet site, should this be desired, or can be transferred directly to some person so the system could be used for running competitions where, say the score on the shots in the game are compiled, thereby allowing multiple players to compete against each other wherever the machines are located, even overseas.

A camera may also record a player's execution of a shot. The output from the cameras and the trajectory calculation can also be used to provide a comparative arrangement whereby the movement of the ball striker and the trajectory of the ball can be directly compared, say in a split screen arrangement with a known, usually professional player effecting the same shot and the trajectory achieved by that player.

As mentioned, if required the target at which the ball is directed may be obtained by a projection screen and it would be possible to vary this, either to vary the game to be played or to vary the type of target. For example if golf is being played the target could be a fairway from a tee, or, say an approach shot. It would also be possible to vary the target from stroke to stroke. Say have a tee shot and then show the target for the second shot depending on the trajectory and speed of the drive and then, say a pitch shot and the player could alter his strokes accordingly.

The player plays his shot within a cage type area which is a confined space surrounded by nets or similar. This means that the game can be played in a small area and indoors. It also means that the ball stays within a confined space for easy retrieval by a player.

The cage is preferably built in a number of modules with each module having a net covered frame. The modules are joined by hinges or bolted together so that the cage is portable and easily assembled and dismantled.

A free hanging net inside the cage ensures that the balls fall to the ground and that spectators with fingers inside the cage will not get hurt. A door is provided for entry into the cage.

The game may have centralised control features. This will allow a game to be monitored from a central location via the Internet. From a central control station the system will be able to do one or a number of things like determine user activity, run competitions, add or change options such as degree of

difficulty and length of games, change images within games and coodinate marketing activity like collecting player names, issuing player cards and receiving and delivering vouchers.

The game is built to be used for any ball sport. The game content and graphics can be taken from existing electronic games.

As an illustration the Australian Rules game can be adapted from the AFL 2004 PlayStation, Gameboy, Xbox game. This is achieved by having the electronic game using the same characteristics as a joy stick.

The existing electronic game title can replace their existing joystick software which enables developers to have game players use a joy stick with software which talks to the sensors, tracks the ball's trajectory and speed of the ball.

The EBG software continually waits for a ball to be kicked hit or thrown. Once it senses a valid shot it passes the electronic game the position of the ball, the trajectory and speed. The game developer can link this into existing game graphics and ball behaviour algorithms to create games from existing game content.

A purpose of the invention is to quickly develop separate games and graphical images for any sport without having to go to the expense of developing the graphics and game programming.

For example if we wish to create a penalty goal kicking game for soccer we can use the existing content(e.g. major stadiums, players etc.) and game program (the scoring, ball dynamics and the routines which determine what happens depending upon the outcome of a shot i.e. goal, save, corner) from an existing soccer game title.

Whilst I have described one particular form of the invention it is to be understood that variations and modifications can be made in this without departing from the spirit and scope of the invention.

DATED this 8th day of April, 2004

E BALL GAMES PTY. LIMITED
By its Patent Attorneys
A TATLOCK & ASSOCIATES